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MPI Guideline No.4

Inspection of Tuberculin Reactors

United States Department of Agriculture
Food Safety and Quality Service
Meat and Poultry Inspection
Program Training Staff

[1980]

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TO THE TRAINER

757226

This guide has been developed to aid you in training veterinarians in the requirements of post-mortem inspection of tuberculin reactors. The approach used during training should be based on four steps which are fundamental in the learning process. These steps are:

1. Prepare the employee:

What the job is and why it is important.

2. Present the job:

Demonstrate and explain each step in the procedure.

3. Try out performance:

Have him do the procedure. Correct errors. Explain fully. Continue until you know he knows.

4. Follow up:

Put him on his own. Check frequently. Taper off your coaching as he gains competence.

When the period of training in general requirements has been completed by the employee, complete the reports on the last two pages of this guide and distribute according to instructions on each page.

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PROCUREMENT SECTION
CURRENT DELIVERABLES

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INTRODUCTION

A vital part of a veterinary medical officer's post-mortem responsibilities is the examination of the carcasses of cattle that have reacted to the tuberculin test. A positive reaction to the tuberculin test indicates either infection by *Mycobacterium bovis* or exposure to some other acid-fast bacilli, including *Mycobacterium tuberculosis* (human form). A thorough post-mortem examination is required to determine the presence and extent of gross lesions or the absence of such lesions. Lesions of avian tuberculosis are rarely seen in cattle and are generally confined to the mesenteric lymph nodes.

Past experience in examining tuberculin reactors has shown lesions are occasionally found in rather obscure locations; therefore, in order to conduct a thorough post-mortem inspection of a reactor carcass, it is necessary to incise and examine certain key lymph nodes in addition to those examined during routine post-mortem inspection. This expanded procedure must also be applied to certain organs and tissue.

This guideline describes the minimum requirements necessary to complete the examination of T.B. reactors. Its purpose is to assure the uniform examination of these animals. The veterinary medical officer is by no means limited to the examination of tissues listed in this guideline. A more detailed examination involving additional lymph nodes and other structures may be performed if the veterinary medical officer thinks it is necessary.

FACILITIES

Adequate facilities and equipment should be provided for handling the viscera during post-mortem inspection. The equipment should be constructed of rust-resistant metal capable of being properly sanitized. If the viscera is presented for inspection in a pan, tray, or truck, this equipment should be large enough that the veterinarian can expose all lymph nodes and visceral organs required to be incised and examined. Adequate lighting must also be provided. At least 50 foot-candles of natural or artificial light is required to see small gross lesions of tuberculosis.

METHOD OF EXAMINATION

After the lymph nodes are exposed, the hook should be placed as close to the node as possible, or even in the edge of the node, to stabilize it for proper incising. Slight tension should be applied with the hook to bring the node into full view and stabilize it. Slicing of the node should begin on that end of the node which is farthest away from the inspector's hook (See figure 1). The nodes should be sliced thinly, using a wrist-rolling motion so that more cut surfaces will be exposed for observation. Hacking and chopping of nodes is not acceptable (See figure 2). Lymph nodes of the viscera can best be incised and examined without the use of a hook (See figure 3).

TERMINOLOGY

This is the first revision of Guideline No. 4 in eleven years. As you read through the guide you will note that the names of many of the lymph nodes have been changed to conform with terminology in the latest edition (fifth) of Sissons and Grossman's *Textbook of Anatomy*. To avoid confusion, both the new and old names of the node will be listed. The old name will be in parentheses.

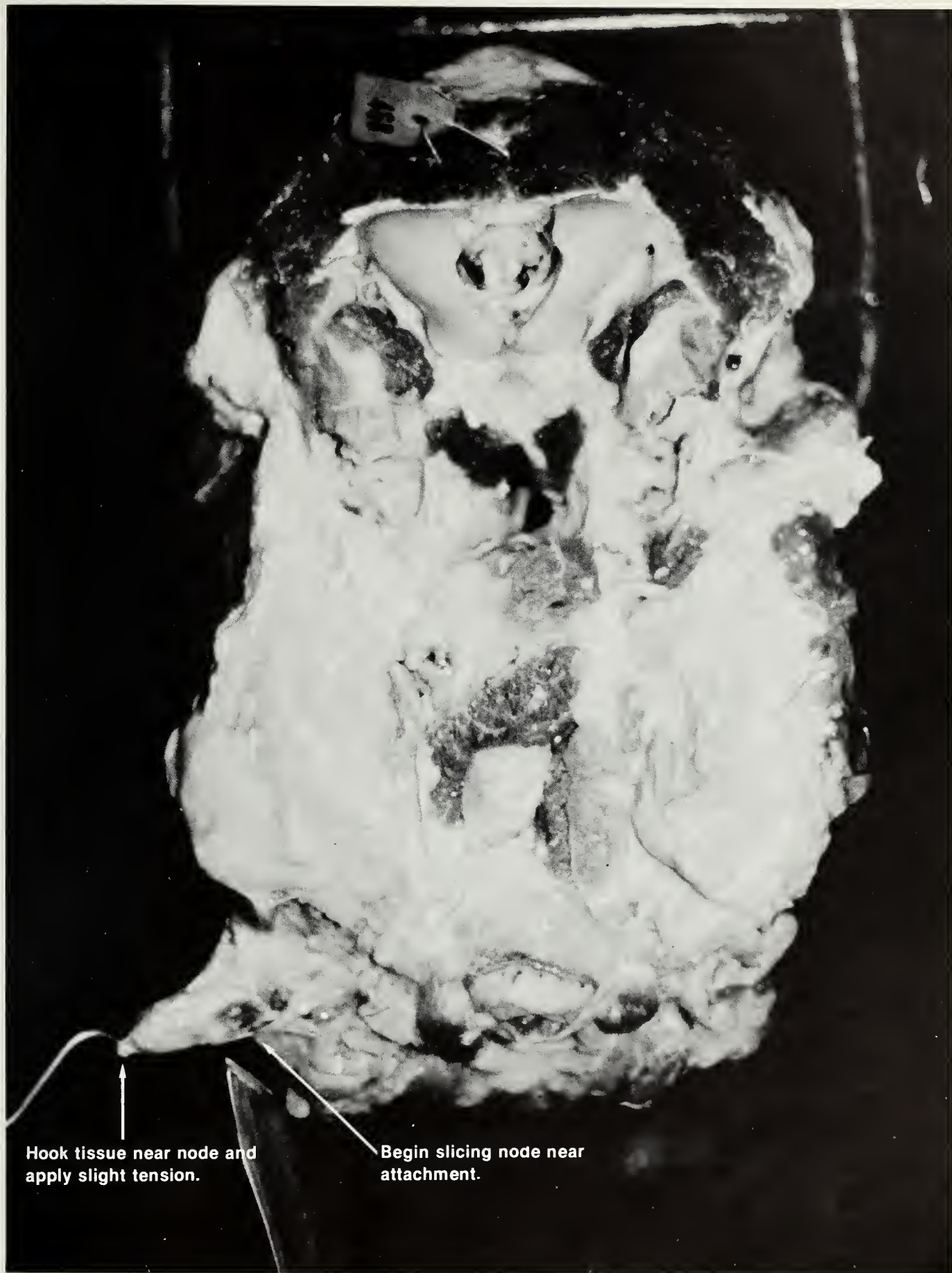


Figure 1

PROPER PLACEMENT OF HOOK

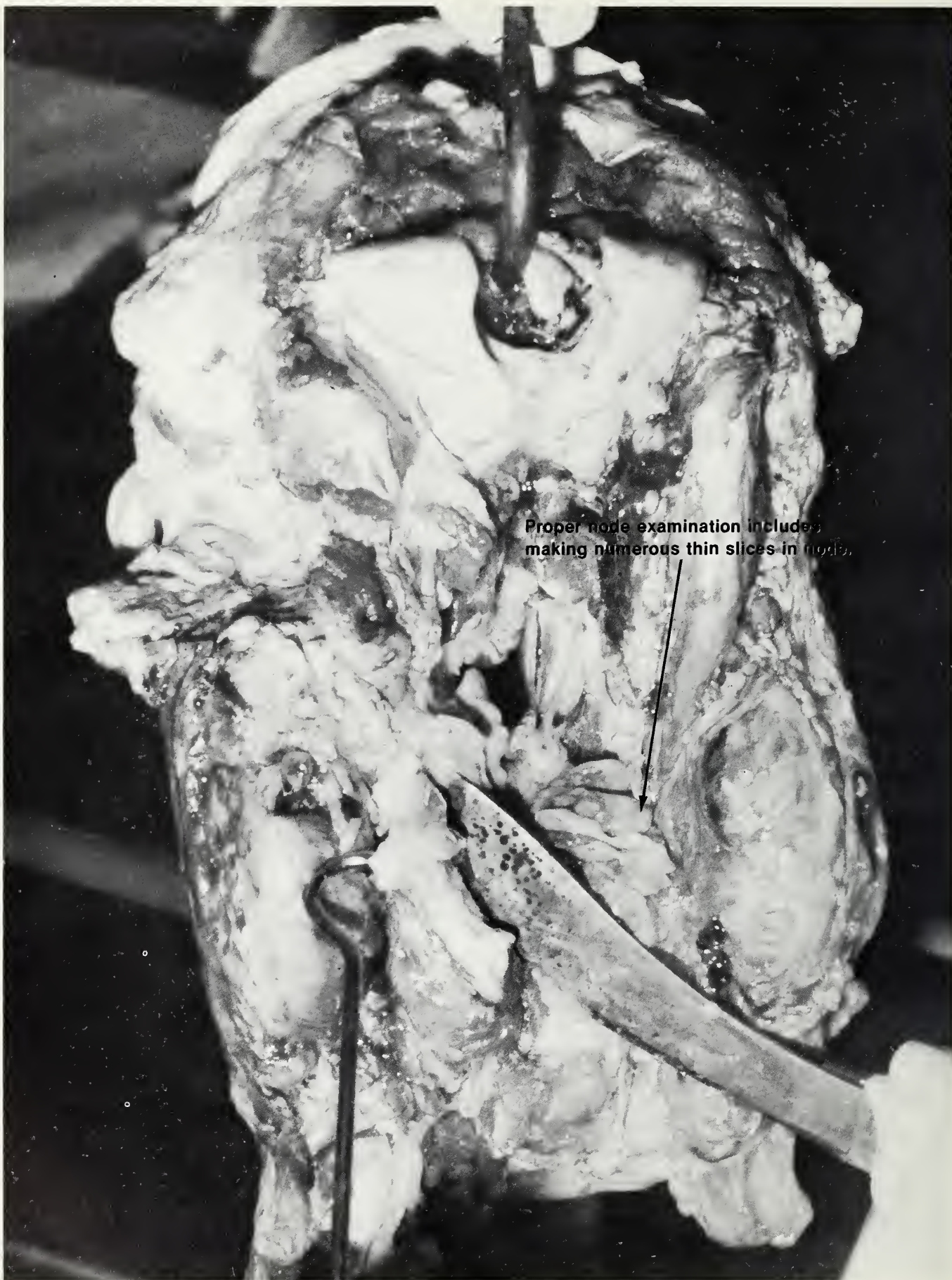


Figure 2

PROPER INCISION OF LYMPH NODE



Figure 3

METHOD OF VISCERA INSPECTION

Use hands rather than hook when inspecting viscera and allied nodes.

HEAD INSPECTION

Cattle heads may be presented for inspection by either the tongue-in or tongue-out method of presentation. In this guideline the location of the lymph nodes will be described assuming a tongue-in presentation. However, photographs that show the location of the nodes in tongue-out presentation have been included should the plant use that method. [See figures 7 and 8].

Lateral Retropharyngeal (Atlantal) Nodes - These nodes are found on either side of the median line midway between the larynx and the foramen magnum and are visible without cutting as the head rests on the inspection rack [See figure 4]. Usually these nodes remain on the head during dressing operations but sometimes are left attached to the neck of the carcass and this must be considered when the nodes are not found on the head. The lateral retropharyngeal nodes are usually discoid in shape and about 4 to 5 cm in length. One or more other small lymph nodes may occur near the large constant ones.

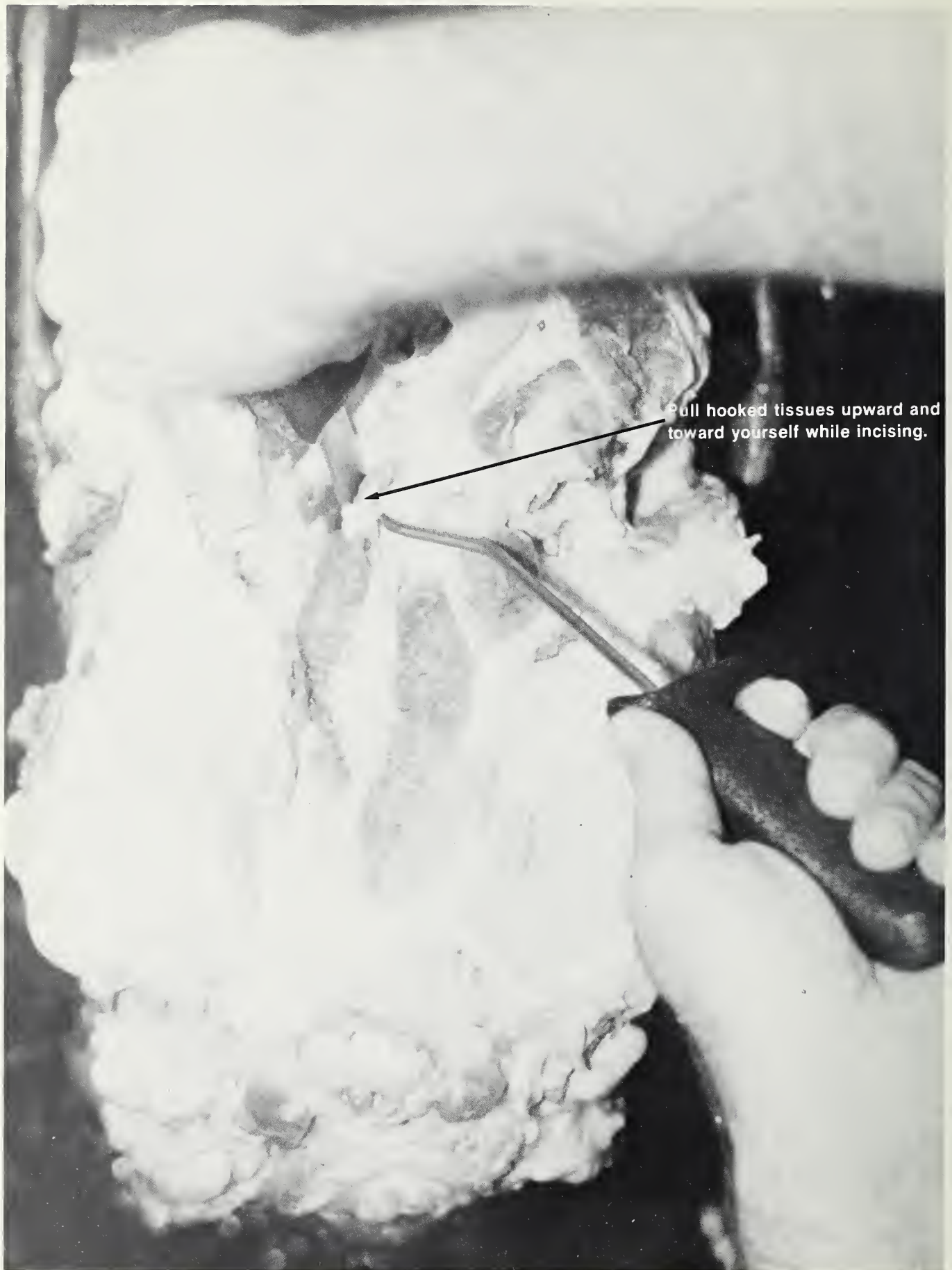
Mandibular Nodes - These nodes are found on each side of the head lateral to the larynx and under the mandibular salivary gland [See figure 4]. After these nodes are examined the immediate area should be observed in search of smaller nodes which are sometimes present.

Parotid Nodes - These nodes are located on each side of the head under the parotid salivary glands [See figure 4]. They can be located on a line drawn between the paramastoid process of the occipital bone and the lateral canthus of the eye in the region of the auditory meatus. The parotid nodes are about 7 1/2 cm long and 2 1/2 cm wide and in some cases two smaller nodes take the place of one larger node.

Medial Retropharyngeal (Suprapharyngeal) Nodes - These nodes usually are two in number but in some cases an additional node is present. They are situated about 3 cm apart, medial to the great cornu of the hyoid bone and between the pharynx and the ventral straight muscles of the head. They average about 8 cm in length. To expose these nodes, the knife should be held in a vertical position and a deep incision made between the great cornu of the hyoid bone about 5 cm from the paramastoid processes [See figure 5]. As this incision is made, the hooked tissue above the nodes should be pulled upward and toward the inspector. This will expose the nodes for examination [See figure 6].



Figure 4
LYMPH NODES OF THE HEAD



Pull hooked tissues upward and toward yourself while incising.

Figure 5

**BEGINNING INCISION TO EXPOSE MEDIAL RETROPHARYNGEAL
(SUPRAPHARYNGEAL) NODES**



Figure 6

EXPOSED MEDIAL RETROPHARYNGEAL (SUPRAPHARYNGEAL) NODES

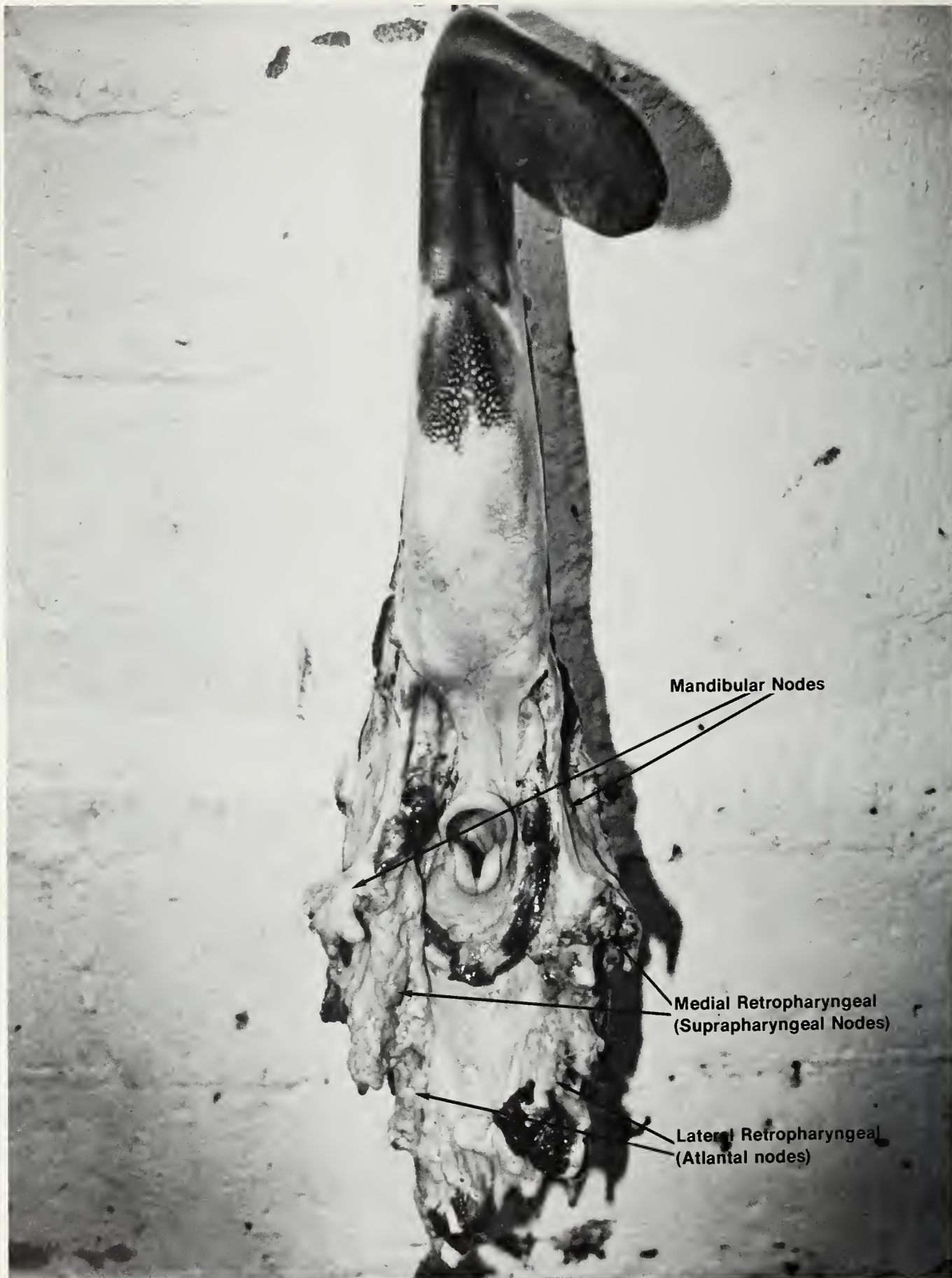


Figure 7

TONGUE-OUT BASE DOWN PRESENTATION

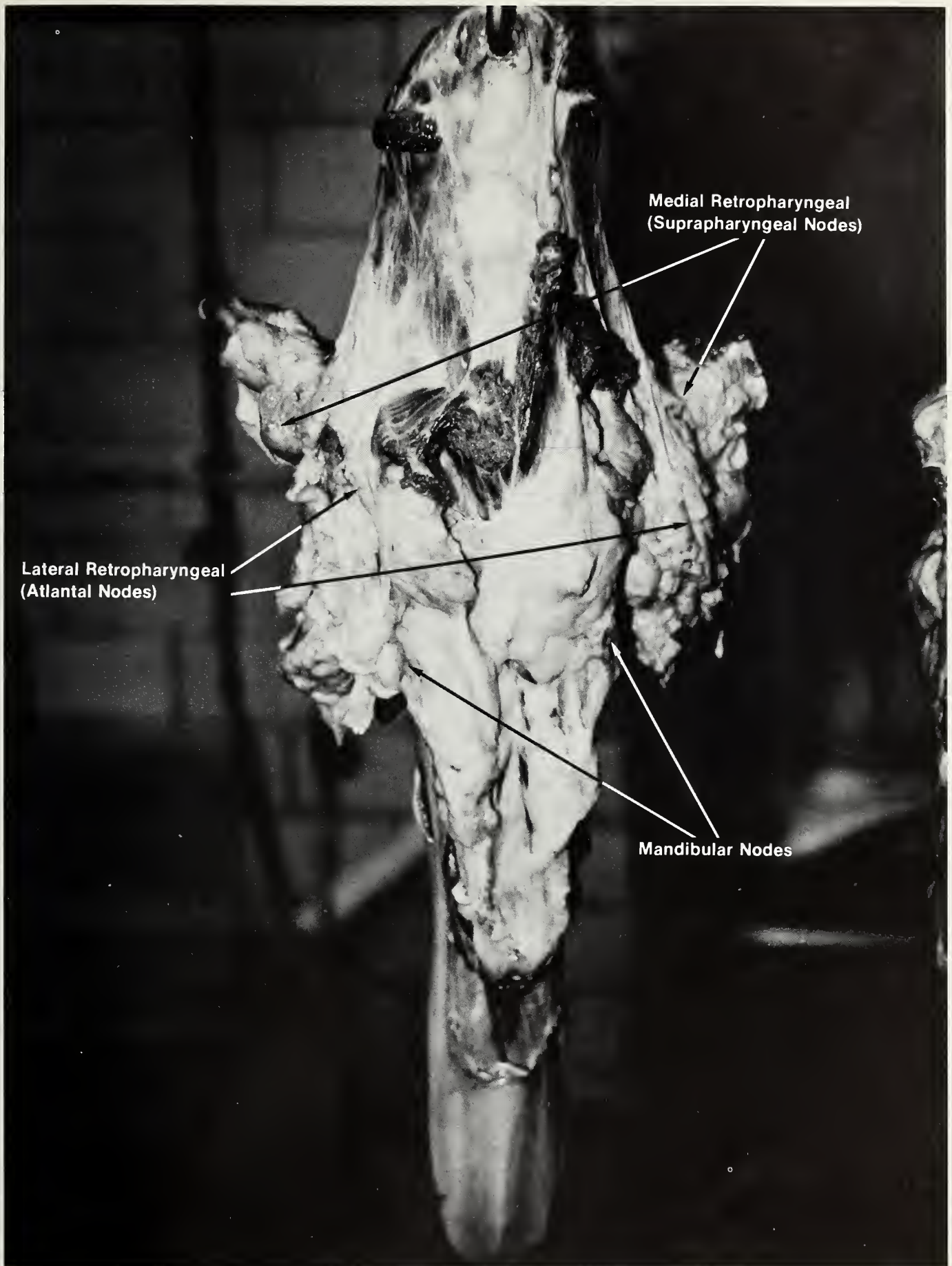


Figure 8
TONGUE-OUT BASE UP PRESENTATION

VISCERA INSPECTION

Left Tracheobronchial (Bronchial) Node - [See figure 9] To locate this node the inspector first grasps the apical lobe of the left lung and lifts upward and toward himself. Then the connective tissue overlying the main left bronchus must be incised between the left lung and the trachea. This node is about 4 cm in length and 2 1/2 cm in width and is very irregular in shape.

Right Tracheobronchial (Bronchial) Node - [See figure 9] This node can be exposed by lifting the stub of the trachea upward and toward the inspector while the connective tissue overlying the main right bronchus is incised between the lung and trachea. This node is smaller than the left tracheobronchial node and occasionally is not present. In some cases two nodes occur in this position.

Cranial (Anterior) Mediastinal Nodes - [See figure 9] These nodes are found in the mass of tissue between the anterior extremities of the lungs. They are four to eight in number and the largest may be 2 1/2 cm or more in length.

Middle (Median) Mediastinal Nodes - [See figure 9] These nodes are situated on the right of or dorsal to the aortic arch and may extend to the right face of the esophagus. Often they may not be clearly distinguishable from the cranial and caudal mediastinal lymph nodes.

Caudal (Posterior) Mediastinal Nodes - [See figure 9] These nodes also vary in number and are found in the mass of tissue between the posterior extremities of the lungs. Small mediastinal nodes should be located by slicing the fat and connective tissue in which they are located between the lungs. Large nodes are visible without searching and should be examined as outlined previously in this procedure.

Lungs - The pulmonary pleura should be visually examined and then by firm palpation with the thumb and fingers the lung tissue should be inspected for small tubercles. The lungs should then be repeatedly incised and the cut surfaces examined.



Figure 9

TRACHEOBRONCHIAL (BRONCHIAL) AND MEDIASTINAL NODES

VISCERA INSPECTION [cont'd]

Cranial Mesenteric and Caudal Mesenteric Lymphocenters (Mesenteric Nodes) - [See figure 10] Comprise a large chain of nodes which receive lymph from the intestinal tract. The intestines are best examined by spreading them out so that the pancreas is visible to the right while the large intestines are away from the inspector. When the intestines are in this position the mesenteric lymph node chain is easily exposed and examined. To the left of the pancreas in the fat attached to the small and large intestines are five or six nodes which are exposed for examination by separating the fat from the intestines beginning at the pancreas and proceeding to the ileo-cecal valve and then along the large intestine in that area. By proceeding in this manner you will expose for examination not only the cranial and caudal mesenteric nodes but also the pancreaticoduodenal, celiac, jejunal, cecal and colic lymph nodes.

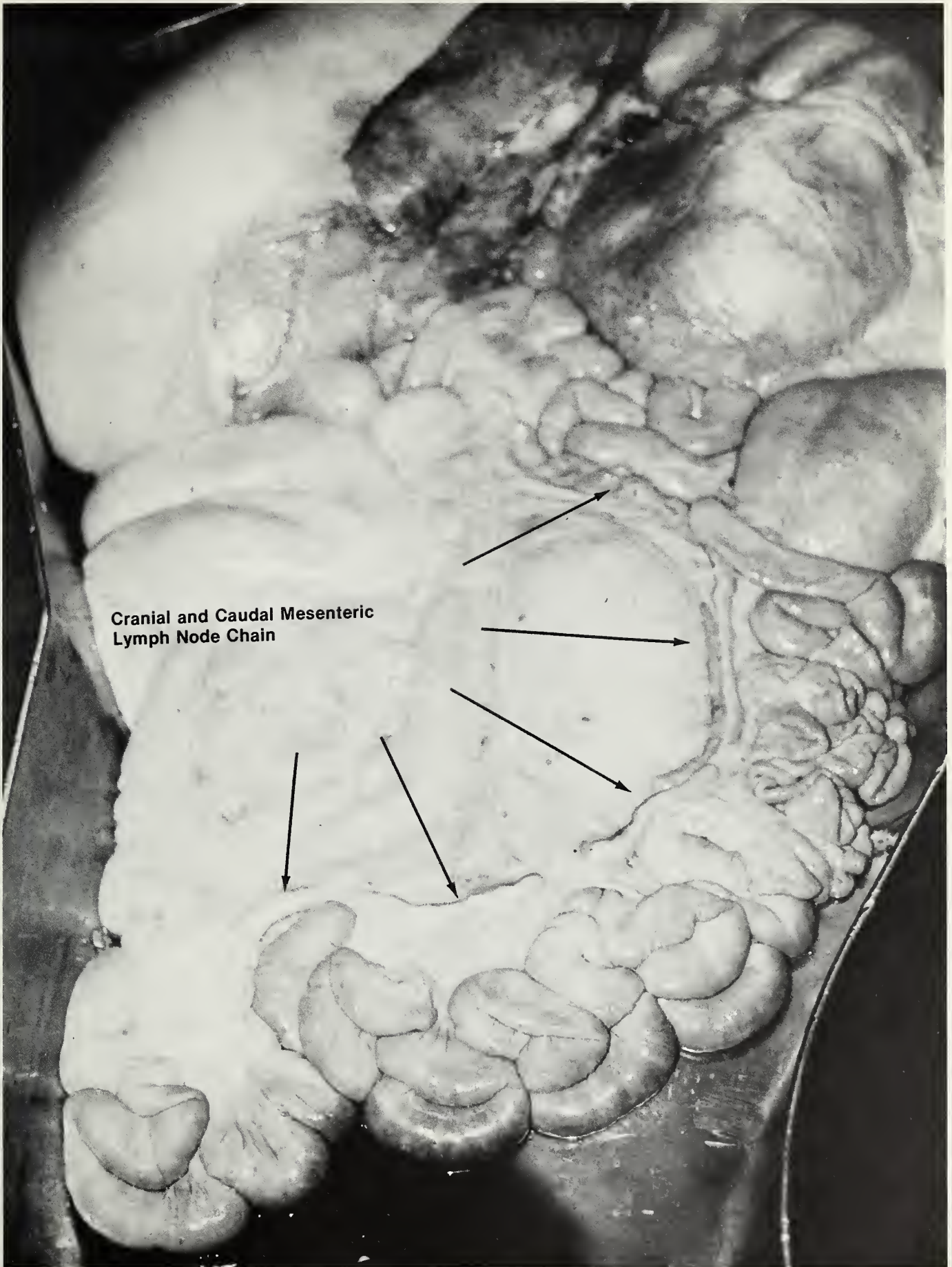


Figure 10

CRANIAL AND CAUDAL MESENTERIC LYMPHOCENTERS (MESENTERIC NODES)

VISCERA INSPECTION [cont'd]

Hepatic (Portal) Nodes - [See figure 11] These nodes are grouped about the portal vein, the hepatic artery and the bile duct on the liver. Occasionally during evisceration some of the nodes are left attached to the viscera in the area of the pancreas.

Liver and Spleen - These organs should be examined visually and by palpation. Tuberculosis lesions of the spleen are often found attached to the splenic capsule. Further inspection of the liver includes the repeated transverse oblique incision into the parenchyma and a visual examination of the cut surfaces.

Ovaries, Oviducts, and Uterus - A visual examination should be made of these tissues. If abnormalities are located at this time a further examination by palpation and by incision should be performed.



Figure 11
LOCATION OF HEPATIC NODES

CARCASS INSPECTION

Deep Popliteal (Popliteal) Nodes - These nodes are about 2 1/2 by 3 cm in size, located in a mass of fat on the gastrocnemius muscle between the biceps femoris and the semitendinosus muscles at about the point of bifurcation of the gastrocnemius. To locate this node in each hindquarter the biceps femoris and semitendinosus muscles should be separated by blunt dissection. The node lies about 10 cm deep midway on a line between the ischiatic tuber and the tuber calcanei of the fibular tarsal bone [See figure 12]. Experience will prevent unnecessary mutilation of carcasses when searching for this node.

Subiliac (Prefemoral) Nodes - These nodes in an average size carcass are situated approximately 30 cm below the patella in the fat of each flank [See figure 13]. The distance from the patella will increase as the size of the carcass increases.

Mammary (Supramammary) Nodes - [See figure 14] In the live female animal these nodes are situated above the posterior border of the mammary gland (udder) and during dressing operations should be left attached to the carcass when the udder is removed. Usually two are present on either side and the larger pair is sometimes united. The smaller nodes are ahead of the larger ones. Occasionally a third node may be present or there may be only one on one side.

Medial (Internal) Iliac Nodes - [See figure 14] These nodes are situated near the origin of the deep circumflex iliac vessels. The nodes may be easily felt by placing the hand on the inner surface of the ilium at about the upper third of the border of the pelvic arch.

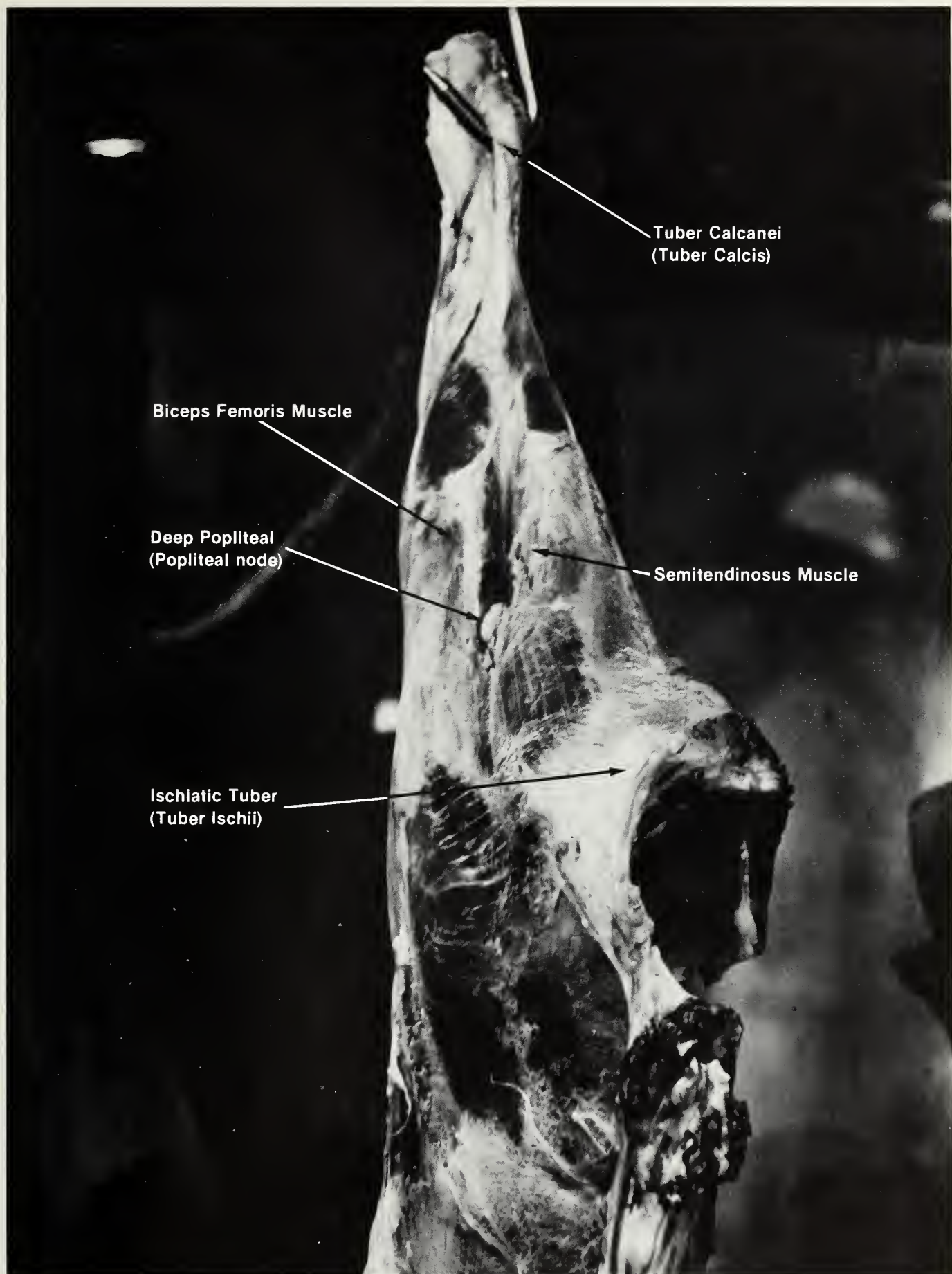


Figure 12

DEEP POPLITEAL NODE SEVERED FROM ITS ATTACHMENTS AND BROUGHT TO SURFACE



Figure 13

LOCATION OF SUBILIAC (PREFEMORAL) NODE

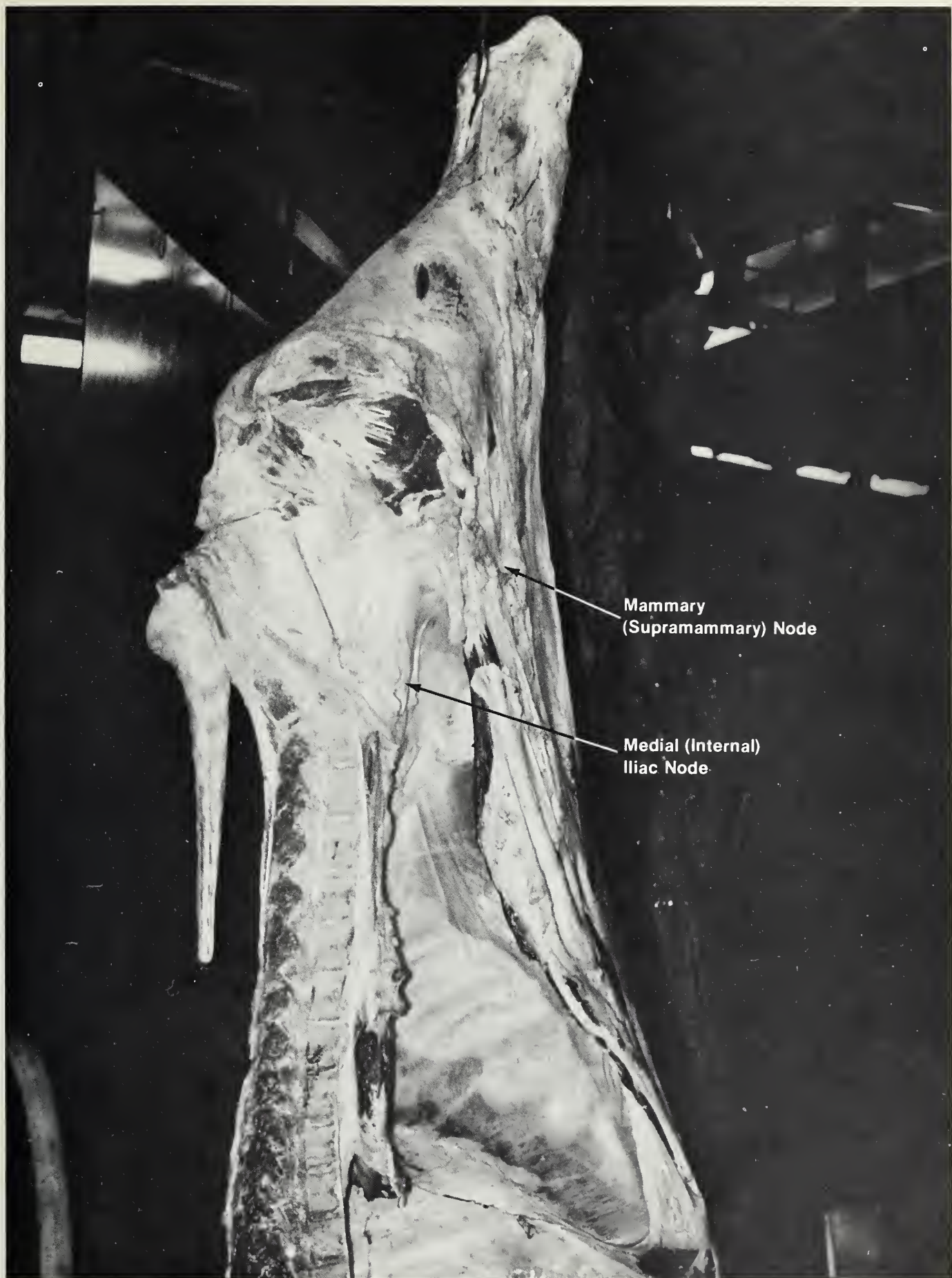


Figure 14

MAMMARY (SUPRAMAMMARY) AND MEDIAL (INTERNAL) ILIAC NODES

CARCASS INSPECTION [cont'd]

Superficial Cervical (Prescapular) Nodes - These nodes can be located on each front quarter on a line between the shoulder joint and the atlas at about one-third the distance from the shoulder.

An incision through the superficial muscles at this point will reveal the node, which should be hooked and pulled from the incision for examination. These nodes are embedded in a cushion of fat so accordingly they can be removed from the incision as explained above [See figure 15]. They are elongated in shape and may obtain a length of 11 to 13 cm and a width of 3 cm or more. They can usually be felt by pressing the fingers forcibly in the hollow of the shoulder in front of the neck of the scapula. An experienced veterinary medical officer need not mutilate the carcass to remove these nodes for examination.

Cranial Deep (Anterior) Cervical, Middle Deep (Middle) Cervical, Caudal Deep (Posterior) Cervical Nodes - [See figure 16] The caudal deep cervical nodes should be incised. The cranial and middle deep cervical nodes must be visually examined. Incision of these nodes is optional. The cranial deep cervical lymph nodes are situated along the anterior part of the trachea on the course of the carotid artery. Four or five may be present and they may vary in length from 1 1/2 to 5 cm. The middle deep cervical nodes will be found in the middle third of the neck on either side of the trachea. They also vary in position, number, and size and may extend to the cranial group or reach almost back to the caudal cervical nodes. The number varies from one to seven on either side and their length ranges from 1/2 to 3 cm or more. Located at the base of the neck near the thoracic inlet are the caudal deep cervical nodes. Usually there are two or four on either side and they are relatively small. They may be found attached to tissues surrounding the trachea or left on the carcass as a result of the dressing operation.

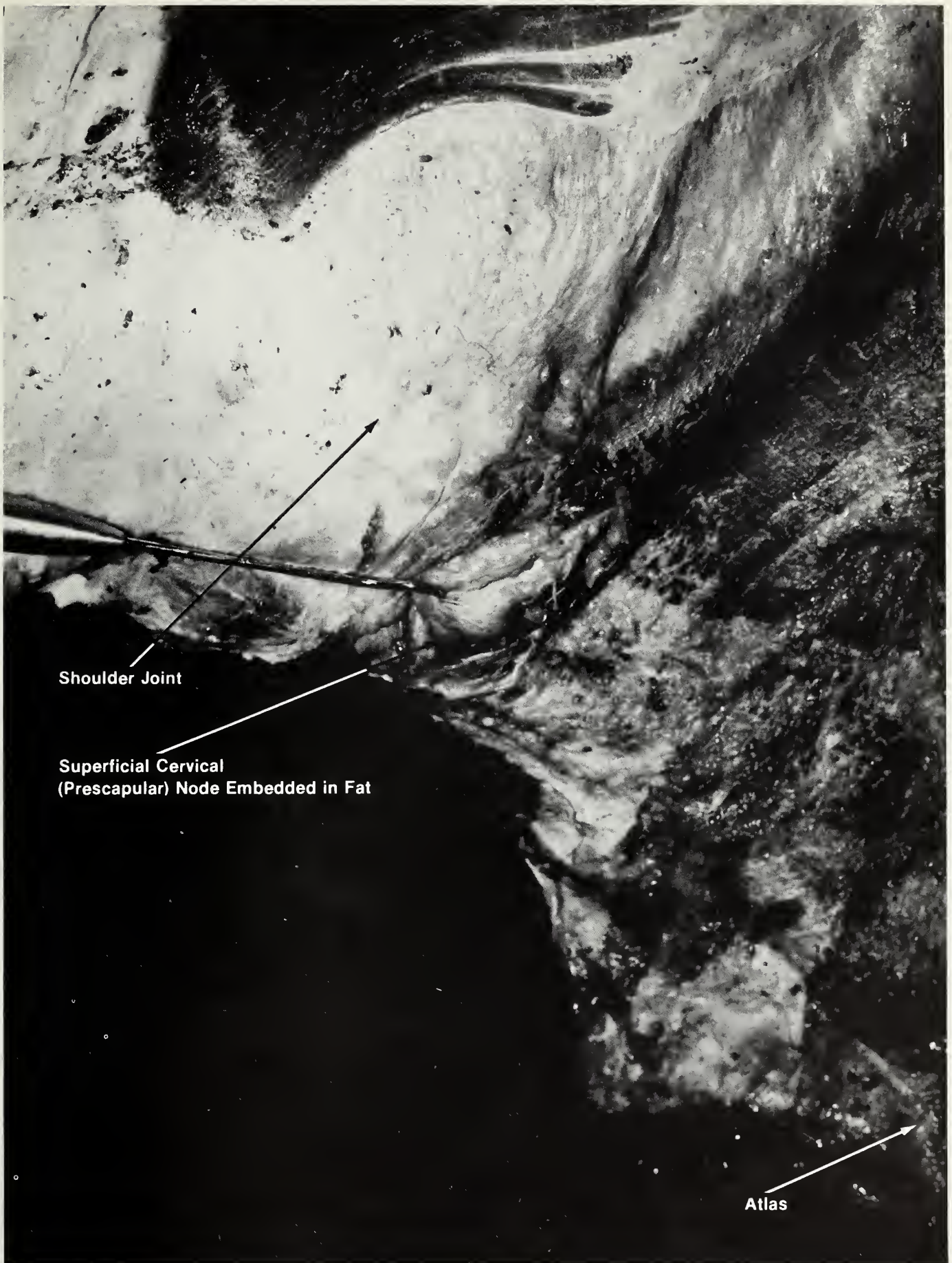


Figure 15

SUPERFICIAL CERVICAL EMBEDDED IN FAT

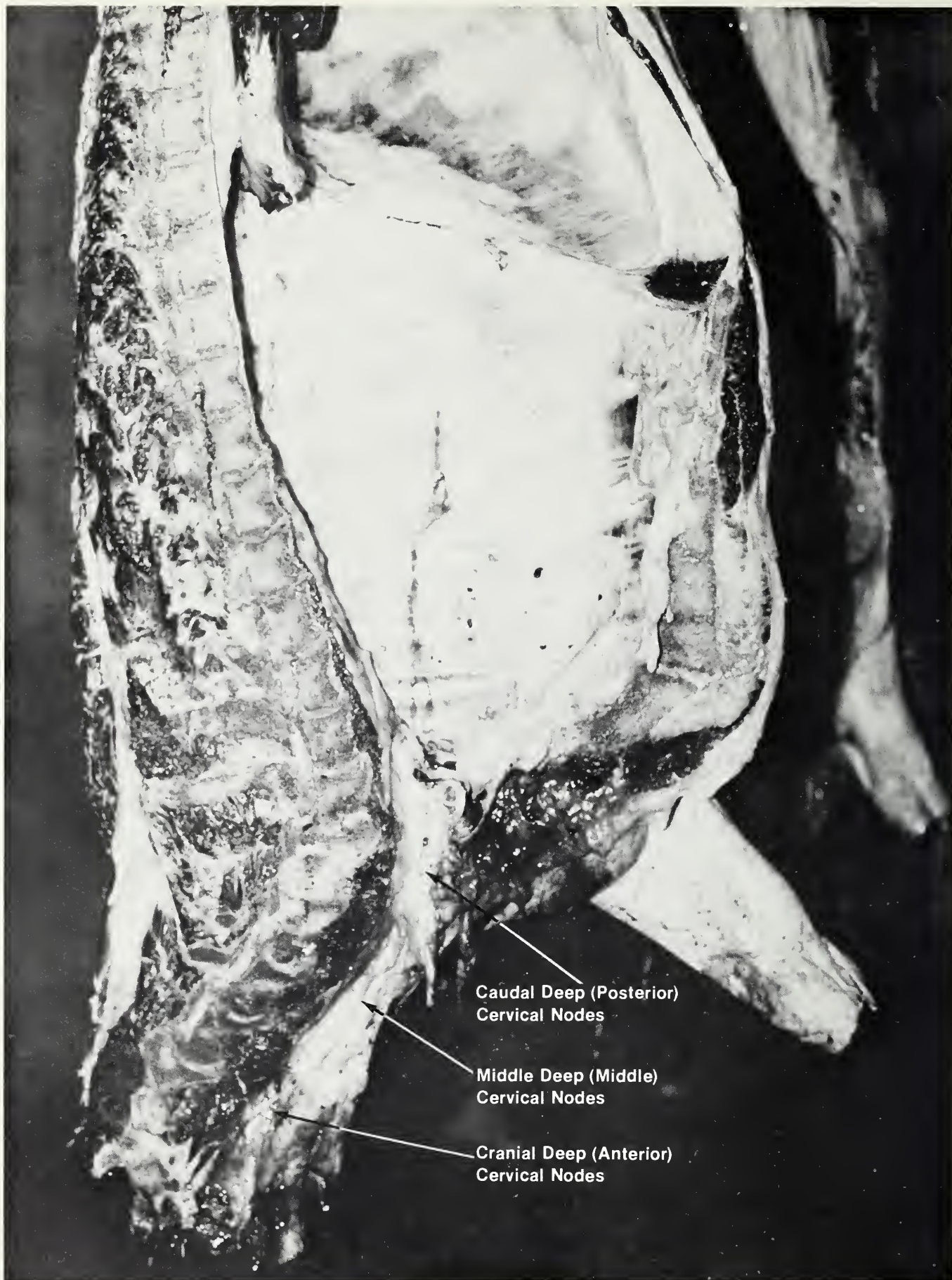


Figure 16

DEEP CERVICAL NODES

OTHER CARCASS INSPECTION EXAMINATION REQUIREMENTS

The parietal pleura and abdominal peritoneum should be visually examined. Palpation of the parietal pleura on the diaphragm will assure the inspector that lesions in this area are not overlooked. Split surfaces of all vertebrae and the surface of the split sternum as well as the spinal cord and its covering should also be observed for lesions.

In summary, it is important to remember that the requirements listed in this guideline are in addition to the routine post-mortem examination. It is also important to remember that these are minimum requirements. The veterinary medical officer has the option, of course, of examining other lymph nodes, organs, or parts if he or she thinks it is necessary.

SUMMARY CHECKLIST

NODES REQUIRING INCISION

Head

- ☐ Lateral Retropharyngeal
- ☐ Mandibular
- ☐ Parotid
- ☐ Medial Retropharyngeal

Viscera

- ☐ Left Tracheobronchial
- ☐ Right Tracheobronchial
- ☐ Cranial, Middle and Caudal Mediastinal
- ☐ Cranial and Caudal Mesenteric Lymphocenters
- ☐ Hepatic

Carcass

- ☐ Deep Popliteal
- ☐ Subiliac
- ☐ Mammary
- ☐ Medial Iliac
- ☐ Superficial Cervical
- ☐ Caudal Deep Cervical
- ☐ Cranial and Middle Deep Cervical — observe (incision optional)

ADDITIONAL PROCEDURES*

- ☐ Lungs — palpate and incise
- ☐ Liver — palpate and incise
- ☐ Spleen — palpate
- ☐ Ovaries, Oviduct and Uterus — observe
- ☐ Parietal Pleura — palpate

*In addition to routine inspection

TRAINING REPORT

I would like to report that _____ ,
EMPLOYEE

GRADE , _____
DUTY STATION

has received training FOR THE INSPECTION OF CATTLE REACTING TO THE TUBERCULIN TEST according to the guideline developed for this phase of inspection. He or she is able to locate and examine the lymph nodes, organs, and other parts as outlined in the procedure. Actual trainee performance of this procedure was approved

DATE .

TRAINER

(Copy for trainee)

TRAINING REPORT

I would like to report that _____ ,
EMPLOYEE

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DATE .

TRAINER

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